

## ORIGINAL ARTICLE

## Prevalence of *Coenurus cerebralis* in sheep in Northwest of Iran

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**Abstract**

This survey was carried out to determine the infection rate of *Coenurus cerebralis* in Urmia abattoir, West Azerbaijan, Iran. A total of 402 sheep heads were examined and the number of *C. cerebralis* cysts per each head was recorded. Thirty three sheep heads were examined each month during 12 months from 2006 to 2007. Of 402 heads, a number of 75 heads (18.65%) were infected with *C. cerebralis*. The cysts located in the left and right hemispheres and cerebellum were 54.63%, 40.20% and 5.15%, respectively. The infected heads contained 1-4 cysts. The highest and lowest prevalence were detected in sheep in March (42.42%) and in July (2.94%), respectively. The infection rates according to age of sheep were 42.02% in 0.5 to 2 years, 22.50% in 2 to 4 years and 8.92% in older than 4 years. The age specific infection rates among age groups were significantly differed ( $P < 0.05$ ). Infection rate in Haraki breed (27.77%) was higher comparing to the rate in the Ghezel breed (21.13%) and Makoie breed (23.91%). However differences between sheep breeds were not statistically significant ( $P > 0.05$ ).

**Introduction**

*Coenurus cerebralis*, the metacestode or larval form of the dog tapeworm *Taenia multiceps*, causes coenurosis, otherwise known as gid or stagger. *C. cerebralis* causes a serious problem in sheep production.<sup>1</sup> The larval stage (metacestode or *Coenurus*) of this cestode, known as *C. cerebralis*, affects the central nervous system (CNS), particularly the brain of sheep and gives rise to the neurological signs of coenurosis (gid or stagger) that in the majority of causes result in the death of the animal from starvation after some weeks.<sup>2,3</sup>

In studies carried out in Iran, *Coenurus* has been reported in sheep,<sup>4,5</sup> goats<sup>6,7</sup> and in a wild sheep.<sup>8</sup> The prevalence of *C. cerebralis* in sheep was found to be 3% in Jordan,<sup>9</sup> 1.3–36.8% in Turkey<sup>10-12</sup> and 2.88% in India.<sup>13</sup> Abo-Shehada *et al.*, (2002)<sup>9</sup> have reported that these parasites are frequently seen during the winter season in sheep in Jordan. In this study, prevalence, localization, size, number of *C. cerebralis* in Urmia city and the effect of age, breed and season on the evolution of the parasite were investigated.

**Materials and Methods**

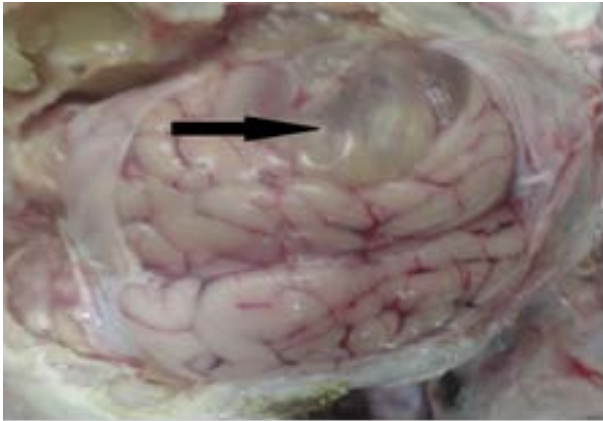
From 2006 to 2007, every month 33 heads were randomly

chosen from the sheep at the Urmia slaughterhouse and examined for the presence of *C. cerebralis*. Age and breed of each animal was determined. The heads cut in the slaughterhouse were opened by electrical saw and the brains were examined. The brains were sliced and checked for the presence, size, number and localization of cyst. Detected cysts and the brain were kept in 70% alcohol. The chi-square test was applied for comparison of age and breed groups.

**Results**

Seventy five (18.65%) of the examined brains were found infected with *C. cerebralis*. Totally 97 cysts were observed in infected heads. The means of cysts was 1-4 cysts. Diameters of cysts were ranged from 1 to 4.5 cm. The results indicated that 45, 13, 6 and 2 sheep infected to 1, 2, 3 and 4 cyst, respectively. The results also showed that 54.63%, 40.20% and 5.15% of larvae were detected in left hemisphere, right hemisphere and cerebellum, respectively (Fig 1). The higher and lower infection of *C. cerebralis* were seen in March (42.42%) and in July (2.94%), respectively ( $P > 0.05$ ) (Fig 2). There was no difference between prevalence

of infection and season ( $P > 0.05$ ). The infection rates according to age of sheep were 42.02% in 0.5 to 2 years, 22.50% in 2 to 4 years and 8.92% in older than 4 years. The age specific infection rates among age groups were significantly differed ( $P < 0.05$ ) (Table1). The rate of infection in different sheep breed was 27.77% for Haraki, 23.91% for Makoie and 21.13% for Ghezel ( $P > 0.05$ ) (Table1).



**Fig 1.** Coenurus cyst on the left cerebral hemisphere in 2 year old Ghezel breed sheep.

**Discussion**

Prevalence of *C. cerebralis* in present investigation was 18.65%. In other studies carried out in Iran, the prevalence rate varied from 0.32-9.8%.<sup>4,5,6,7</sup> In several countries, the prevalence of larvae were found to be 3% in Jordan,<sup>9</sup> 4.5% in Ethiopia,<sup>1</sup> 2.88% in India<sup>13</sup> and 1.3-36.8% in Turkey.<sup>10,11,12</sup>

In this survey the great majority of cysts were located in the cerebral hemisphere (5.15%), 54.63% in the left and 40.20% in the right one. These results were similar to the results from Jordan,<sup>9</sup> Turkey,<sup>12</sup> Ethiopia<sup>1</sup> and Italy.<sup>16</sup>

In our study, the highest and lowest prevalence were in March (42.42%) and in July (2.94%), respectively. In Jordan and Turkey, the infections were found mostly during the winter season and the least in summer.<sup>9, 15</sup> In other study in Italy the highest prevalence of infection was found from March to July.<sup>16</sup>

In this survey the great majority of cysts were located in the cerebral hemisphere (5.15%), 54.63% in the left and



**Fig 2.** Monthly prevalence of *Coenurus cerebralis* in sheep.

40.20% in the right one. These results were similar to the results from Jordan,<sup>9</sup> Turkey,<sup>12</sup> Ethiopia<sup>1</sup> and Italy.<sup>16</sup>

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In our study, cyst sizes were between 1-4.5 cm. Biyikoglu and Doganay (1998) reported that the cyst sizes were between 0.3-4.2 cm.<sup>11</sup> Achenef *et al.*, (1999) reported the cysts sizes were between 0.8-6.5 cm.<sup>1</sup> Necrosis and calcification of cysts were reported in some studies<sup>11</sup> but those finding were not observed in our study.

In conclusion, coenurus is an important disease in young sheep of the region. Therefore, to prevent sheep from this parasite, effective control measures must be taken, such as prohibition of illegal slaughtering, and public awareness of the epidemiology of the *C. cerebralis*. Dogs should be prevented from feeding on sheep heads and medicated with efficient drug.

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**Table 1.** Infection rates to *Coenurus cerebralis* according to age and breed.

	Age (years)			Breed			Total
	0.5-2	2-4	>4	Haraki	Ghezel	Makoie	
<b>Number of examined sheep</b>	69	120	213	162	194	46	402
<b>Infected sheep (%)</b>	29(42.02%)	27(22.5%)	19(8.92%)	45(27.77%)	41(21.13%)	11(23.91%)	75(18.65%)

## References

1. Acheneff M, Markos T, Feseha G. *Coenurus cerebralis* infection in Ethiopian highland sheep: incidence and observations on pathogenesis and clinical signs. *Trop Anim Health Prod* 1999; 31: 15-24.
2. Scala A, Varcasia A. Updates on morphobiology, epidemiology and molecular characterization of coenurosis in sheep. *Parassitologia* 2006; 48(1-2): 61-63.
3. Welchman DDEB, Bekh-Ochir G. Spinal Coenurosis causing posterior paralysis in a goat in Mongolia. *Vet Rec* 2006; 158: 238-239.
4. Eslami A. *Veterinary Helminthology*. 1st ed. Tehran, Iran: University Publication Center, 1996; 2: 77-150.
5. Oryan A, Moghaddara AN, Gaur SNS. Metacestodes of sheep with special reference to their epidemiological status, pathogenesis and economic implications in Fars Province, Iran. *Vet Parasitol* 1994; 51(3-4): 231-240.
6. Gharagozlou MJ, Mobedi I, Akhavan P. A pathological and parasitological study of *Coenurus Gaigeri* infestation of Goats from Iran. *Indian J Vet Pathol* 2003; 27: 95-97.
7. Nourani H, Pirali Kheirabadi K. Cerebral coenurosis in a goat: pathological findings and literature review. *Comp Clin Pathol* 2009; 18: 85-87.
8. Toofanian F, Ivoghli B. Cerebral coenurosis in a wild sheep (*Ovis ammon*). *J Wildl Dis* 1976; 12: 550-551.
9. Abo-Shehada MN, Jebreen E, Arab B. Prevalence of *Taenia multiceps* in sheep in northern Jordan. *Prev Vet Med* 2002; 55: 201-207.
10. Akkaya H, Vurusaner C. *Coenuriasis cerebralis* in sheep and Calves Slaughtered in Istanbul. *Acta Parasitol Turcica* 1998; 22(3): 320-324.
11. Biyikoglu G, Doganay A. Effects of praziquantel and albendazole on *Coenurus cerebralis* in experimentally infected lambs. *Turk J Vet Anim Sci* 1998; 22: 43-48.
12. Uslu U, Guclu F. Prevalence of *Coenurus cerebralis* in sheep in Turkey. *Vet Med*. 2007; 63(6): 678-680.
13. Varma TK, Malviya HC. Prevalence of coenurosis in sheep, goat and pigs in Bareilly, Uttar Pradesh. *J Vet Parasitol* 1989; 3: 69-71.
14. Gemmell MA, Lawson JR, Roberts MG. Population dynamics in echinococcosis and cysticercosis -evaluation of the biological parameters of *Taenia hydatigena* and *Taenia ovis* and comparison with those of *Echinococcus granulosus*. *Parasitology* 1987; 94: 161-180.
15. Gicik Y, Kara M, Arslan M. Prevalence of *Coenurus Cerebralis* in sheep in Kars province. *Bull Vet Inst Pulawy* 2007; 51: 379-382.
16. Scala A, Cancedda GM, Varcasia A, Ligios C, Garippa G, Genchi C. A survey of *Taenia multiceps* Coenurosis in Sardinian sheep. *Vet Parasitol* 2007; 143(3-4): 294-298.